CLAIMS

What is claimed is:

1.   A method of inhibiting metastasis in a mammal, comprising administering to a mammal in need thereof an effective amount of an agent which alters the actin-based cytoskeleton of one or more tumor cells in the mammal thereby inhibiting metastasis.

2.   A method according to Claim 1, wherein the mammal is a human.

3.   A method according to Claim 1, wherein the agent inhibits the actin-based cytoskeleton.

4.   A method of inhibiting metastasis in a mammal, comprising administering to a mammal in need thereof an effective amount of an agent wherein said agent inhibits the activity of one or more genes selected from the group consisting of the genes encoding fibronectin, RhoC, thymosin β4, t-PA, angiopoietin 1, IEX-1/Glu96, RTP/NDR1, fibromodulin, Hsp70, IL13 Rec. α2, Sec61β, snRNP polypeptide C, collagen Iα2, UBE21, KIAA0156, TGFβ superfamily, surfactant protein C, lysozyme M, matrix Gla protein, Tsa-1, collagen IIIα1, biglycan, α-catenin, valosin-containing protein, ERK-1, α-actinin 1, calmodulin, EIF4γ, α-centractin, IQGAP1, cathepsin S and EF2 such that metastasis is inhibited.

5.   A method according to Claim 4, wherein the agent inhibits the activity of the gene directly.

6.   A method according to Claim 4, wherein the agent inhibits the activity of the gene by inhibiting the activity of a downstream effector of the gene.

7. A method according to Claim 4, wherein the gene encodes RhoC.

8. A method according to Claim 1, wherein the mammal has one or more non-metastatic tumors and wherein the agent alters the actin-based cytoskeleton of one or more cells of the tumor.

9. A method according to Claim 8, wherein the mammal has one or more non-metastatic conditions selected from the group consisting of melanoma, breast cancer, ovarian cancer, prostate cancer, lung cancer, bone cancer, throat cancer, brain cancer, testicular cancer, liver cancer, stomach cancer, pancreatic cancer, and combinations thereof.

10. A method according to Claim 1, wherein the agent is selected from the group consisting of nucleic acid molecules, antibodies, peptides, organic molecules, inorganic molecules, and combinations thereof.

11. A method according to Claim 10, wherein the nucleic acid molecules are selected from the group consisting of one or more antisense molecules and nucleic acid molecules encoding one or more dominant negative forms of a gene product.

12. A method of predicting the likelihood of development of a metastatic condition in a mammal, comprising the steps of:

a) obtaining a biological sample from a mammal to be tested;

b) determining the level of one or more gene products which alter the actin-based cytoskeleton of one or more tumor cells in the mammal; and

c) comparing the level determined in (b) with an appropriate control,

wherein if the level determined in (b) is greater than the level of the gene
product in the control, then the mammal has an increased likelihood of
developing a metastatic condition.

13. A method according to Claim 12, wherein the mammal is a human.

5 14. A method of predicting the likelihood of development of a metastatic condition
in a mammal, comprising the steps of:

a) obtaining a biological sample from a mammal to be tested;

b) determining the level of one or more gene products selected from the
group consisting of fibronectin, RhoC, thymosin β4, t-PA, angiopoietin
10 1, IEX-1/Glu96, RTP/NDR1, fibromodulin, Hsp70, IL13 Rec. α2,
Sec61β, snRNP polypeptide C, collagen Iα2, UBE21, KIAA0156, TGFβ
superfamily, surfactant protein C, lysozyme M, matrix Gla protein, Tsa-
1, collagen IIIα1, biglycan, α-catenin, valosin-containing protein, ERK-1,
α-actinin 1, calmodulin, EIF4γ, α-centractin, IQGAP1, cathepsin S, or
15 EF2, in one or more tumor cells in the mammal; and

c) comparing the level determined in (b) with an appropriate control,
wherein if the level determined in (b) is greater than the level of the gene
product in the control, then the mammal has an increased likelihood of
developing a metastatic condition.

20 15. A method according to Claim 14, wherein the gene product is RhoC.

16. A method according to Claim 12, wherein the control is a sample from a normal
mammal.

17. A method according to Claim 12, wherein the metastatic condition is selected
from the group consisting of metastatic forms of melanoma, breast cancer,

ovarian cancer, prostate cancer, lung cancer, bone cancer, throat cancer, brain cancer, testicular cancer, liver cancer, stomach cancer, pancreatic cancer, and combinations thereof.

18. A method according to Claim 4, wherein the agent inhibits a gene product at the level of transcription, translation, or protein activity.

19. A method according to Claim 12, wherein the biological sample is a blood sample or a cell sample from a tumor in the mammal.

20. A method of identifying an agent which regulates metastasis of a tumor cell, comprising the steps of:

a) contacting one or more tumor cells with an agent to be tested; and

b) determining the level of one or more gene products which regulate the actin-based cytoskeleton in the cell,

wherein if the level of the gene product is altered in the presence of the agent as compared with the level of the gene product in the absence of the agent, then the agent regulates metastasis of a tumor cell.

21. A method of identifying an agent which regulates metastasis of a tumor cell, comprising the steps of:

a) contacting one or more tumor cells with an agent to be tested; and

b) determining the level of one or more gene products selected from the group consisting of fibronectin, RhoC, thymosin $\beta4$, t-PA, angiopoietin 1, IEX-1/Glu96, RTP/NDR1, fibromodulin, Hsp70, IL13 Rec. $\alpha2$, Sec61β, snRNP polypeptide C, collagen I$\alpha2$, UBE21, KIAA0156, TGFβ superfamily, surfactant protein C, lysozyme M, matrix Gla protein, Tsa-1, collagen III$\alpha1$, biglycan, α-catenin, valosin-containing protein, ERK-1,

α-actinin 1, calmodulin, EIF4γ, α-centractin, IQGAP1, cathepsin S and

EF2. which regulate the actin-based cytoskeleton in the cell,

wherein if the level of the gene product is altered in the presence of the agent as

compared with the level of the gene product in the absence of the agent, then the

5   agent regulates metastasis of a tumor cell.

22.   A method according to Claim 21, wherein the gene product is RhoC.

23.   A method of inhibiting metastasis in a mammal, comprising administering to a

mammal in need thereof an effective amount of an agent which alters the actin-

based cytoskeleton of one or more tumor cells in the mammal, wherein the agent

10   is identified by a method according to Claim 20.

24.   A method of inhibiting metastasis in a mammal, comprising administering to a

mammal in need thereof an effective amount of an agent which alters the

expression of a gene which regulates metastasis in one or more tumor cells in the

mammal, wherein the agent is identified by a method according to Claim 21.

15   25.   A method according to Claim 24, wherein the gene product involved in

metastasis is selected from the group consisting of fibronectin, RhoC and

thymosin β4.

26.   A method of inhibiting metastasis in a mammal, comprising administering to a

mammal in need thereof an effective amount of an agent which alters the

20   expression of rhoC in one or more tumor cells in the mammal thereby inhibiting

metastasis.

27.   A method of predicting the likelihood of development of a metastatic condition

in a mammal, comprising the steps of:

a)   obtaining a biological sample from a mammal to be tested;

b)   determining the level of one or more gene product which regulates
metastasis in one or more tumor cells in the mammal; and

c)   comparing the level determined in (b) with an appropriate control,

5   wherein if the level determined in (b) is greater than the level of the gene
product in said control sample, then the mammal has an increased likelihood of
developing a metastatic condition.

28.   A method according to Claim 27, wherein the gene products involved in
metastasis is selected from the group consisting of fibronectin, RhoC, thymosin

10   β4, t-PA, angiopoietin 1, IEX-1/Glu96, RTP/NDR1, fibromodulin, Hsp70, IL13
Rec. α2, Sec61β, snRNP polypeptide C, collagen Iα2, UBE21, KIAA0156,
TGFβ superfamily, surfactant protein C, lysozyme M, matrix Gla protein, Tsa-1,
collagen IIIα1, biglycan, α-catenin, valosin-cont. prot., ERK-1, α-actinin 1,
calmodulin, EIF4γ, α-centractin, IQGAP1, cathepsin S and EF2.

15   29.   A method of predicting the likelihood of development of a metastatic condition
in a mammal, comprising the steps of:

a)   obtaining a biological sample from a mammal to be tested;

b)   determining the level of rhoC gene product in one or more tumor cells in
the mammal; and

20   c)   comparing the level determined in (b) with the level of rhoC gene
product in an appropriate control,
wherein if the level determined in (b) is greater than the level of the rhoC gene
product in said control, then the mammal has an increased likelihood of
developing a metastatic condition.

25   30.   A method of identifying an agent which regulates metastasis of a tumor cell,
comprising the steps of:

a)   contacting one or more tumor cells with an agent to be tested; and

b)   determining the level of one or more gene products which regulates

metastasis in a tumor cell,

wherein if the level of the gene product is altered in the presence of the agent as

5   compared with the level of the gene product in the absence of the agent, then the

agent regulates metastasis of a tumor cell.

31.   A method according to Claim 30, wherein the gene which regulates metastasis is

selected from the group consisting of fibronectin, RhoC, thymosin β4, t-PA,

angiopoietin 1, IEX-1/Glu96, RTP/NDR1, fibromodulin, Hsp70, IL13 Rec. α2,

10   Sec61β, snRNP polypeptide C, collagen Iα2, UBE21, KIAA0156, TGFβ

superfamily, surfactant protein C, lysozyme M, matrix Gla protein, Tsa-1,

collagen IIIα1, biglycan, α-catenin, valosin-cont. prot., ERK-1, α-actinin 1,

calmodulin, EIF4γ, α-centractin, IQGAP1, cathepsin S and EF2.

32.   A method of identifying an agent which regulates metastasis of a tumor cell,

15   comprising the steps of:

a)   contacting one or more tumor cells with an agent to be tested; and

b)   determining the level of rhoC gene product,

wherein if the level of rhoC gene product is altered in the presence of the agent

as compared with the level of rhoC gene product in the absence of the agent,

20   then the agent regulates metastasis of a tumor cell.

33.   A method of identifying an agent which inhibits metastasis of a tumor cell,

comprising the steps of:

a)   contacting one or more tumor cells with an agent to be tested; and

b)   determining the level of rhoC gene product,

wherein if the level of rhoC gene product is decreased in the presence of the agent as compared with the level of rhoC gene product in the absence of the agent, then the agent inhibits metastasis of a tumor cell.

34.   A method of identifying an agent which increase metastasis of a tumor cell, comprising the steps of:

a)   contacting one or more tumor cells with an agent to be tested; and

b)   determining the level of rhoC gene product,

wherein if the level of rhoC gene product is increased in the presence of the agent as compared with the level of rhoC gene product in the absence of the agent, then the agent increases metastasis of a tumor cell.

35.   A method for formulating a therapeutic regimen comprising the steps of:

a)   predicting metastasis according to Claim 27; and

formulating the therapeutic regimen accordingly.